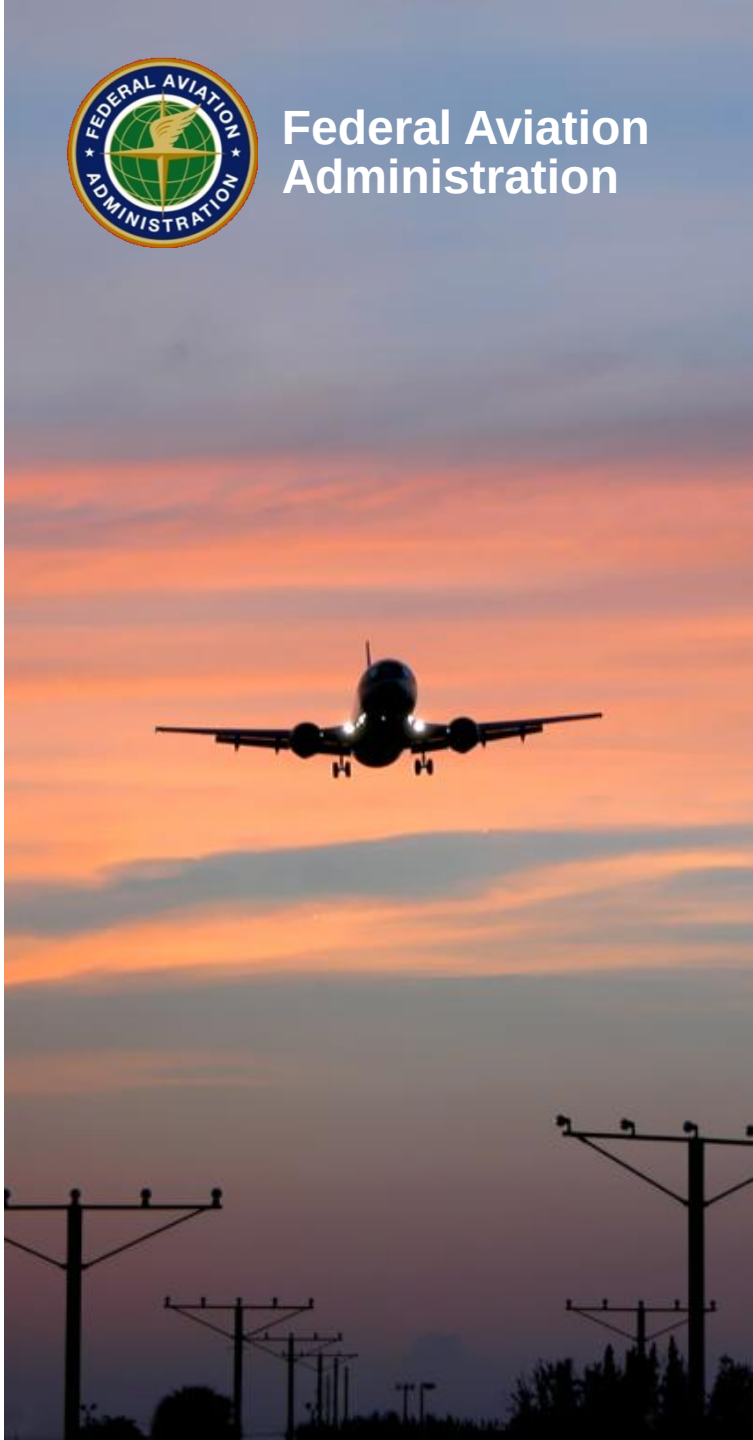
Program Management Organization

General Aviation Search and Rescue Forum

Presented to: National Transportation Safety Board

July 18, 2012

Federal Aviation Administration



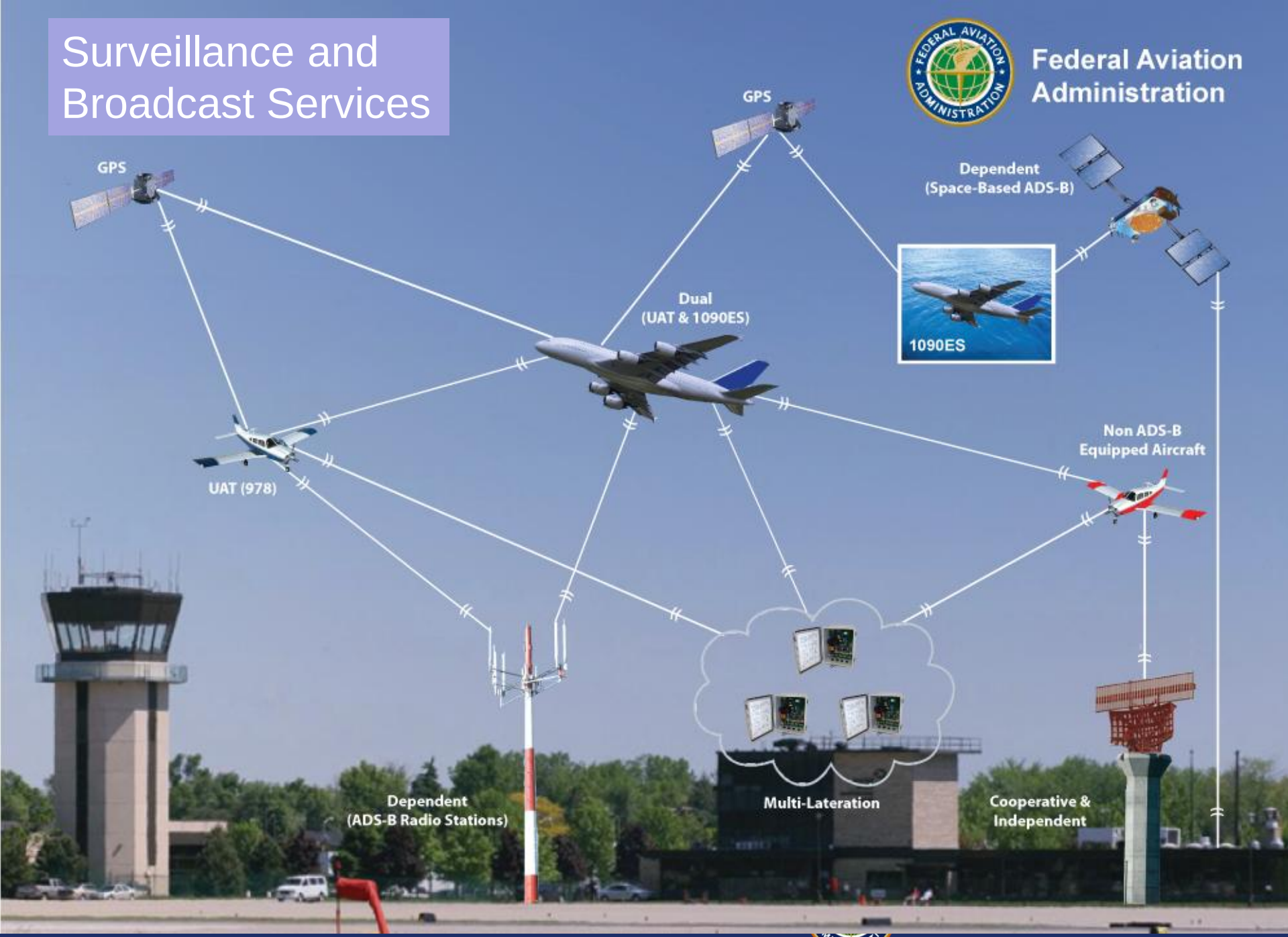
Agenda

- **Overview**
  - Emerging Technologies
  - Surveillance and Broadcast Services
  - Program Definition
  - Funding Status
- **Implementation Status**
- **Industry Collaboration**
- **Opportunities**
- **Next Steps**

Emerging Technologies can aid in:

Accident Prevention	• Air Traffic Control Services • Pilot Services	• Improved Situational Awareness • Improved surveillance of aircraft and vehicles • Weather In the Cockpit • Alerts
Response / Recovery Time	• Air Traffic Control Services • Data sharing	• Expanded coverage in non-radar airspace and under radar coverage floor

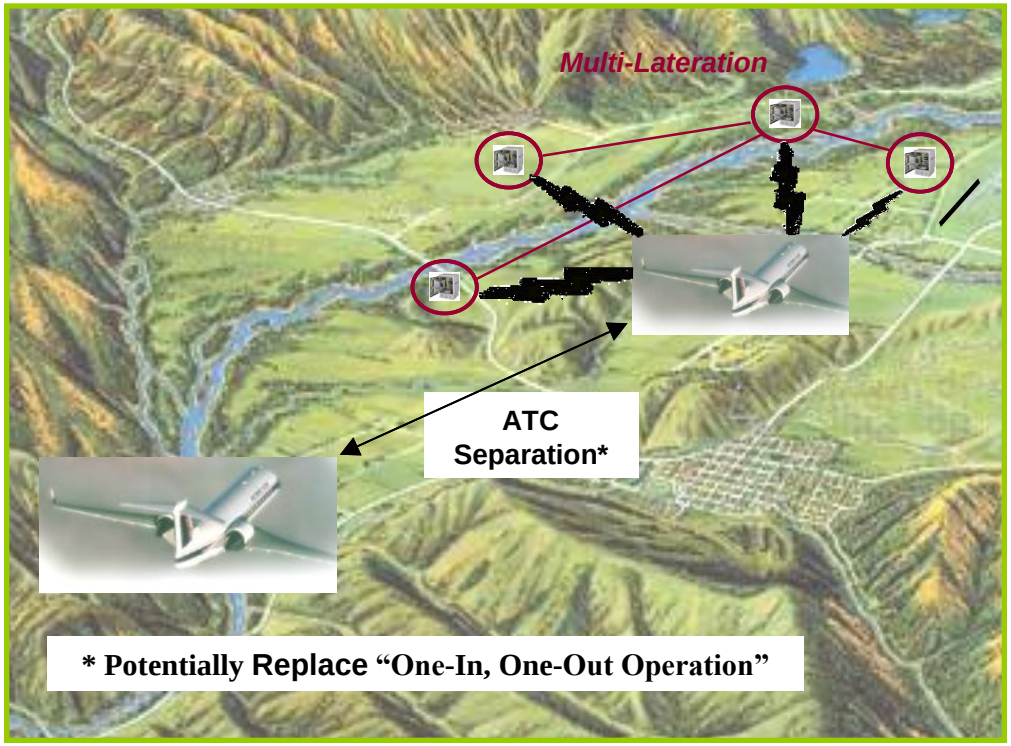
Surveillance and Broadcast Services



Definitions: Wide Area Multilateration (WAM)

- Multilateration is a surveillance technology that works by employing multiple remote sensors throughout an area to compensate for terrain obstructions.
- The data from multilateration sensors is used to determine aircraft position and identification. This data is processed for Air Traffic Control use and provides En Route separation services

Typical Mountain Approach (Single Runway/mountain airport)



Definitions: ATC Separation Services: Automatic Dependent Surveillance - Broadcast (ADS-B)

- **A**utomatic
  - Periodically transmits information with no pilot or operator input required
- **D**ependent
  - Position and velocity vector are derived from the Global Positioning System (GPS)
- **S**urveillance -
  - A method of determining position of aircraft, vehicles, or other asset
- **B**roadcast
  - Transmitted information available to anyone with the appropriate receiving equipment

Definitions: Cockpit Services

Traffic Information Services – Broadcast TIS-B is a service which provides ADS-B equipped aircraft with position reports from secondary surveillance radar on non-ADS-B equipped aircraft.

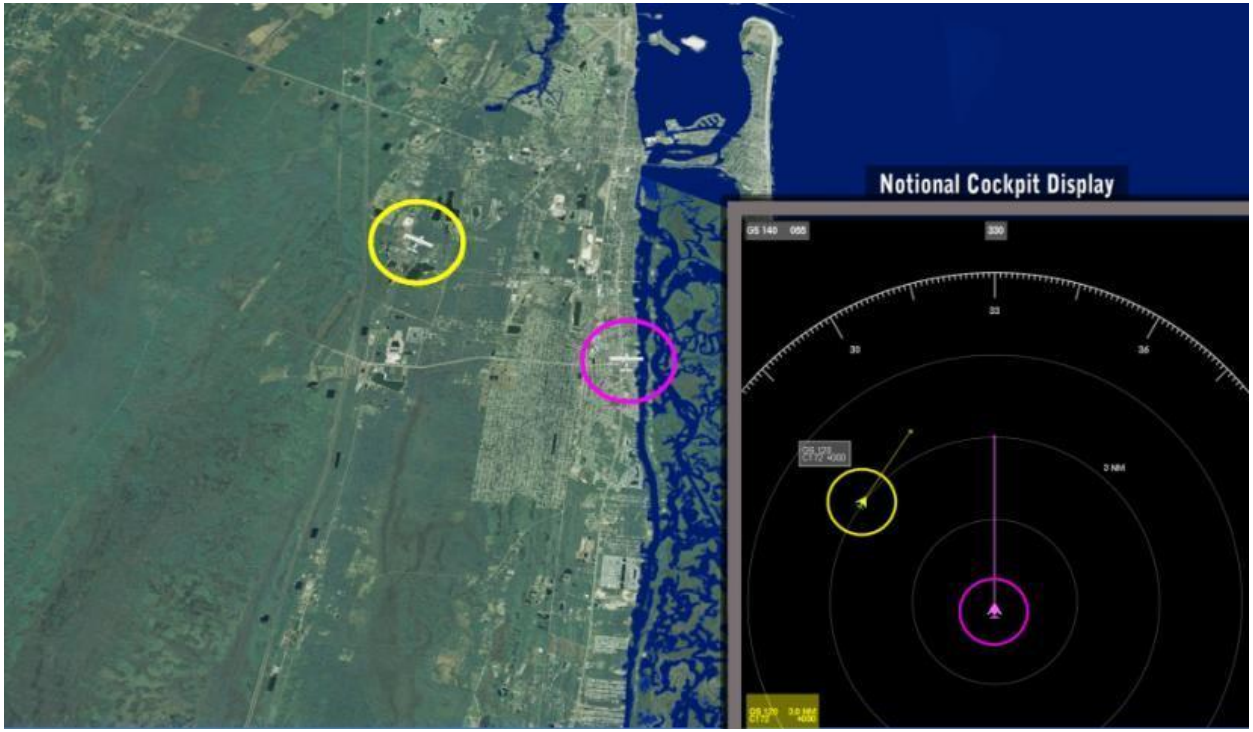
Free FIS-B products include:

- AIRMET: Airmen's Meteorological Information
- Convective SIGMET: Significant meteorological event
- METAR / SPECI: METAR- hourly weather report and SPECI: special weather observation
- NEXRAD Reflectivity: Radar weather (graphical weather)
- NOTAMs D/FDC: Distance Notice to Airmen / National Notice to Airmen
- PIREP: Pilot report
- SIGMET: Significant meteorological event
- SUA Status: Special use airspace status
- TAF / AMEND: Terminal area forecast / any amendments to the forecast
- Temperature Aloft
- Winds Aloft

Flight Information Services – Broadcast (FIS-B) transmits graphical National Weather Service products, pilot reports, and special use airspace.

ADS-B In Application: Traffic Situation Awareness with Alerts (TSAA)

- Provides pilots and flight crew of non-TCAS II equipped aircraft, specifically general aviation, with enhanced traffic situation awareness in all classes and domains of airspace by providing timely alerts of qualified airborne traffic in the vicinity (alerts using voice annunciations and visual attention-getting cues)



Program Funding

Timeframe	Amount	Scope

FY2007 – FY2014	$1.7B	• ADS-B Out
		  • ATC Surveillance
		  • Ground-based Interval Management-Spacing (GIM-S)
		• ADS-B In
		  • Traffic Situation Awareness – Basic (TSA-Basic)
		  • Airport Traffic Situation Awareness (ATSA)
		  • Enhanced Visual Approach
		  • Cockpit Display of Traffic Information (CDTI) Assisted Visual Separation (CAVS)
		  • Traffic Situation Awareness with Alerts (TSAA)
		  • Weather and NAS Situation Awareness (WNSA)

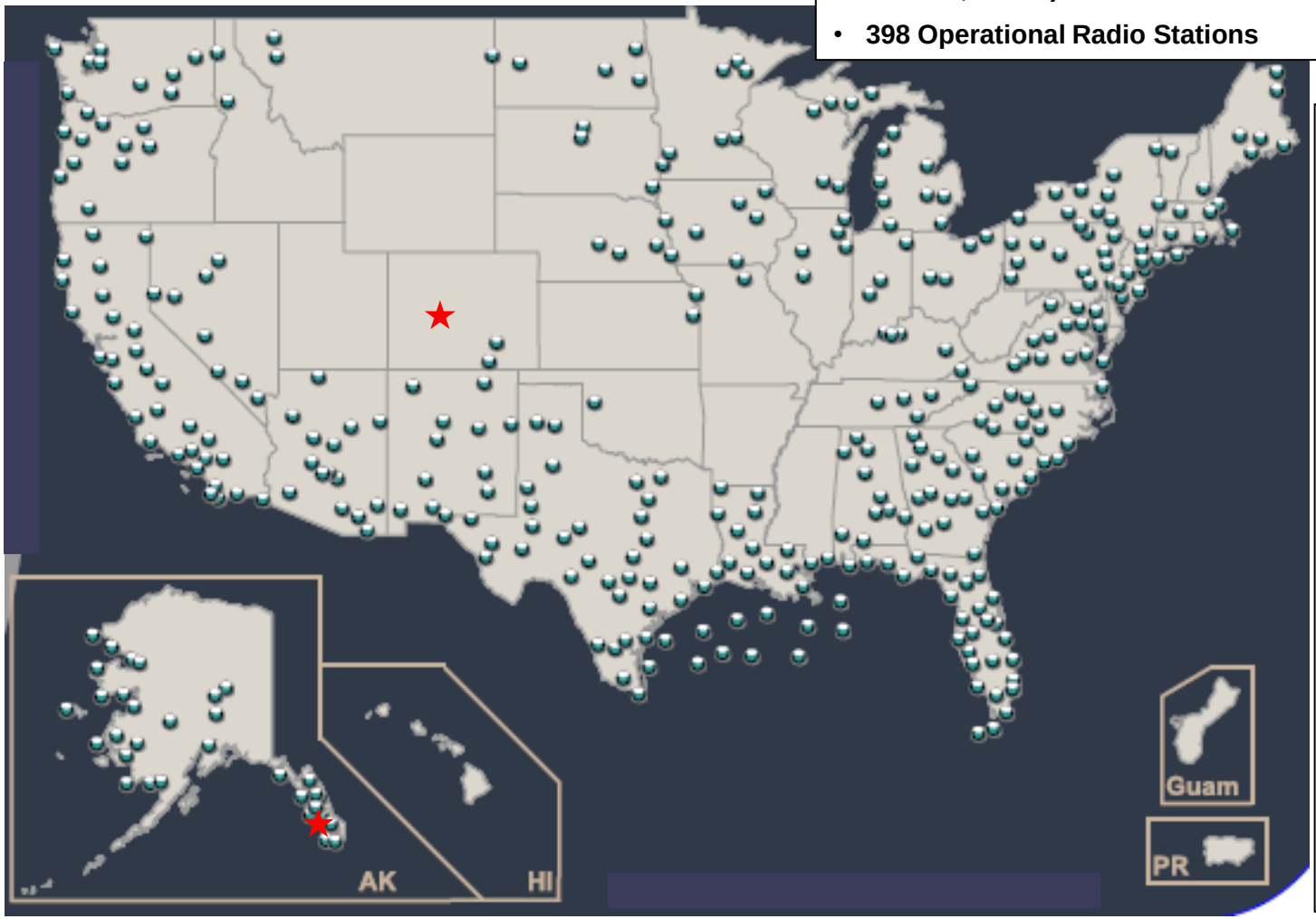
FY2014 – FY2020	$960.4M	• Continued provision of baseline services and applications • Expansion of services in the Gulf of Mexico • Implementation of the ADS-B 'In' application called In Trail Procedures

Implementation Status

July 2, 2012

http://www.faa.gov/nextgen/flashmap/

- **Fiscal Year-End Plan for 2012 – 500 Radio Stations (467 in CONUS; 33 AK)**
- **398 Operational Radio Stations**



★Note: Juneau, Alaska and mountainous areas in Colorado also have Wide Area Multilateration (WAM) systems

ADS-B Separation Services will be provided at:

- 24 En Route Service Delivery Points
- 159 Terminal Service Delivery Points
- 44 Surface Service Delivery Points (advisory)

General Aviation Partners

SSA Agreement

Colorado DOT Agreement

AOPA Agreement

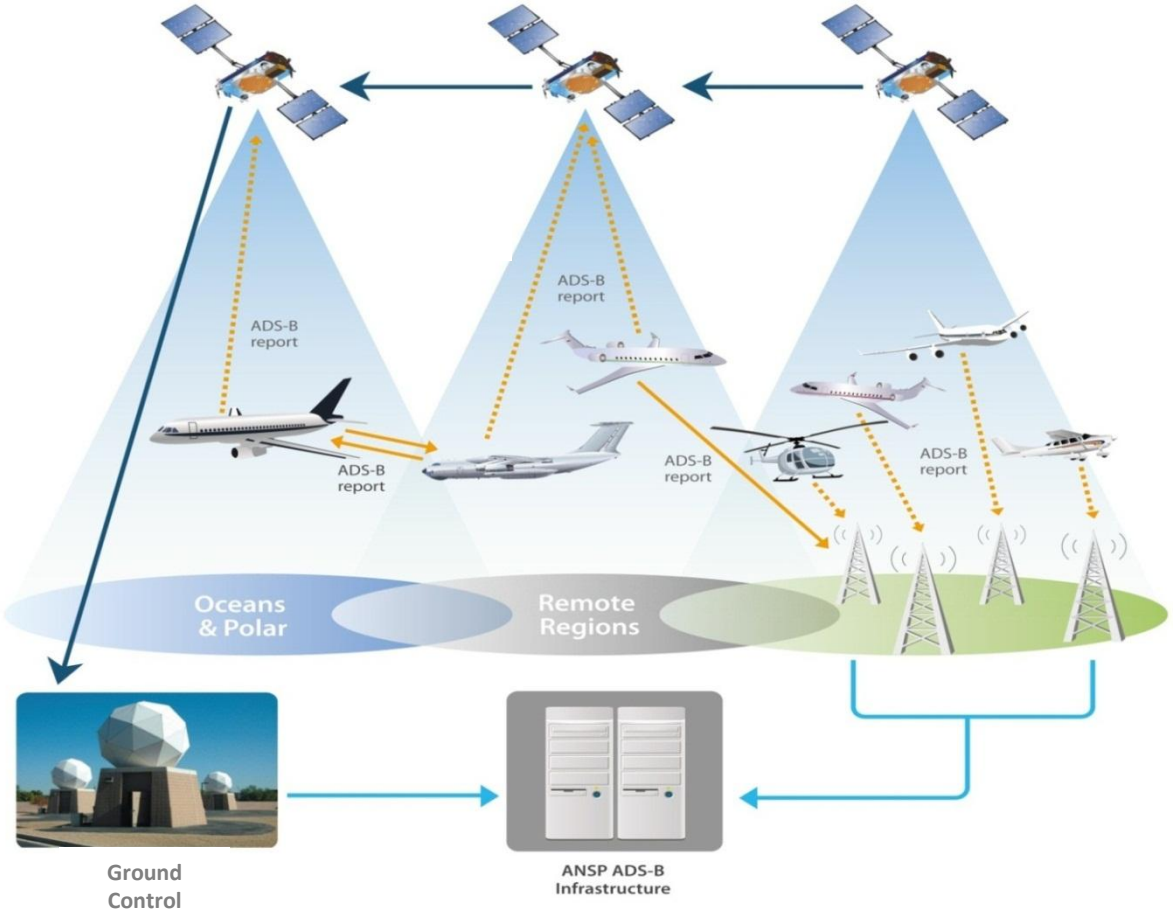
Alaskan Aviation Community & State Representative Agreement

ARC and Industry Work Group Member

HAI & Gulf of Mexico Helicopter/Platform Owners Agreement

Future Potential Opportunities

- **The FAA is exploring an opportunity to provide coverage in additional service volumes via a Space Based ADS-B solution in Oceanic Flight Information Regions (FIRs) and remote domestic airspace**
  - FAA intends to be actively engaged in setting the specifications and configuration of Space Based ADS-B surveillance



Next Steps

Milestone	Date
Complete Minimum Operational Performance Standards for the TSAA application	2013
Complete ground infrastructure deployment	2014
Complete ATC separation services rollout	2015
Complete Surface rollout	2017
ADS-B Out final Rule compliance effective date	January 2020

Backup

Service Delivery Points for ATC Separation Services									
	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	Operational
En Route	2	0	4	15	3	0	0	0	2 of 24
Terminal	2	1	3 of 16	45	52	43	0	0	6 of 159
Surface (Advisory)	2	0	6 of 14	15	5	1	5	2	8 of 44

Rule-Driven ADS-B Out Avionics Equipage 149

ATC Spacing Services

Ground-Based Interval Mgmt - Spacing (GIM-S) (En Route only)

2011 - 2012 GIM-S Develop → 2013 GIM-S Deploy → ⊗ → 2013 - 2014 GIM-S Test → 2014 GIM-S IOC → 2020 Avionics Equipage

Flight Deck Based Interval Mgmt– Spacing (FIM-S)

In Trail Procedures (ITP)

Traffic Situation Awareness with Alerts (TSAA)

Pilot Applications

Pilot Advisory Services								
	FY08	FY09	FY10	FY11	FY12	FY13	FY14	Actual / Planned
Radio Station Installations	11	43	211	101	79 of 134	184	46	445 of 730
Operational Radio Stations	398							

TIS-B
FIS-B
ADS-R

ADS-B In Avionics Equipage 778

In Process | Complete

As of 7-2-2012

Program Benefits

Scope Area	Lifecycle (PV $M)
Baseline Services and Applications	**$5,886.6**
Expanded coverage in the Gulf of Mexico	**$69.3**
ADS-B In-Trail Procedure	**$33.6**
Total	**$5,989.5**

Program Benefits: Baseline Services and Applications

Location	Application	Outcome	Total (PV $M)
CONUS, Hawaii, and Caribbean Surveillance	Radar Airspace ATC Surveillance	Surveillance cost avoidance	$405.3
		Reduction and more efficient maneuvers in response to URET	$261.5
		More efficient metering based on improved TMA accuracy	$489.3
		Increased safety on the surface by controllers	$4.9
		More efficient ATC management of surface movement	$25.0
		Reduction in FAA subscription charges due to value added services	$7.7
CONUS, Hawaii, and Caribbean Broadcast Services	Enhanced Visual Acquisition and Conflict Detection	Fewer aircraft-to-aircraft conflicts	$373.4
	Weather and NAS Status Situational Awareness	Fewer encounters with hazardous weather	$526.3
		More efficient routes in adverse weather	$9.3
		Reduction in user costs to obtain weather info	$36.6
		Fewer aircraft-to-terrain conflicts	$662.2
CONUS, Hawaii, and Caribbean Aircraft Applications	Enhanced Visual Approach - Initial Application	More efficient spacing on approach in VMC	$236.6
	Enhanced Visual Approach - CAVS	Continuation of Visual Approaches in marginal conditions	$445.8
	Enhanced Visual Approach - Merging and Spacing	Increased ability to perform continuous descent approaches	$357.6
	ADS-B ATC Automation Integration		
	Airport Surface Situational Awareness	Increased safety on the surface by pilots	$9.5
	Final Approach and Runway Occupancy Awareness		
Gulf of Mexico Surveillance	Non-Radar Airspace ATC Surveillance (includes weather and comm as needed)	High Altitude - Increased Capacity	$775.8
		High Altitude - Optimal Routing	$175.7
		Low Altitude - Increased Capacity	$279.4
		Low Altitude - Reduction in Weather Related Accidents	$11.2
Alaska Surveillance and Broadcast Services	Weather and NAS Status Situational Awareness Enhanced Visual Acquisition and Conflict Detection	Fewer aviation accidents in Alaska	$189.1
		More efficient weather decisions	$22.9
	Non-Radar Airspace ATC Surveillance	Access to lower altitude routes in Alaska	$32.4
		Increased IFR capacity (JNU)	$1.3
		Fewer aircraft-to-aircraft conflicts (JNU)	$0.0
		Improved search and rescue services in Alaska	$9.6
		Less one-in-one-out airport delays	$0.3
	Radar Airspace ATC Surveillance	Less radar outage delays (backup)	$0.6
Alaska Airport IFR Upgrade Services	Weather Automation upgrade and IFR Approach Development	Increased access to remote villages in Alaska	$94.4
		Increased Medevac access to remote villages in Alaska	$281.3
Colorado Surveillance and Broadcast Services	Enhanced Visual Acquisition and Conflict Detection	Fewer aircraft-to-aircraft conflicts	$0.4
	Non-Radar Airspace ATC Surveillance	Increased IFR capacity	$155.9
		Improved search and rescue services	$5.2
		Total	**$5,886.6**